

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-16 Cancelled

17. (Currently amended) A method of cleaning at least one of a reaction tube which is included in a heat treatment apparatus and an exhaust pipe which is connected to the reaction tube, said method comprising:

~~a loading step of~~ loading an object to be heat-treated into the reaction tube;

~~a first film forming step of~~ forming a first film on the object [[,]] by supplying ~~a~~ first reactant gas into the reaction tube;

~~a second film forming step of~~ forming a second film on the object [[,]] after stopping supplying the first reactant gas into the reaction tube and supplying second reactant gas which differs from the first reactant gas; and

~~a cleaning step of~~ removing a product produced in said first film-forming step and a product produced in said second film-forming step [[,]] which ~~attache~~ ~~attach~~ to at least one of the reaction tube and the exhaust pipe, by exhausting gas contained in the reaction tube through the exhaust pipe and supplying ~~fluoride hydrogen~~ ~~hydrogen fluoride~~ gas into at least one of the reaction tube and the exhaust pipe ~~via a plurality of inlets which are connected to parts of the~~

reaction tube and exhaust pipe where conductance of a gas-flowing path is relatively lower, to thereby clean at least one of the reaction tube and the exhaust pipe.

18. (Currently amended) The cleaning method according to claim 17, further comprising:

~~a raising step of raising the~~ temperature of the reaction tube and heating up the exhaust pipe in a range from 100 to 200°; and

~~a maintaining step of maintaining the~~ pressure within the exhaust pipe in a range between 10kPa to 30kPa.

19. (Currently amended) The cleaning method according to claim 17, comprising ~~a cleaning step of~~ cleaning at least one of the reaction tube and the exhaust pipe by supplying ~~fluoride hydrogen~~ hydrogen fluoride gas thereinto [[,]] while controlling the pressure within the exhaust pipe to be fluctuated in a range between 0.1kPa and 30kPa.

20. (Currently amended) ~~The cleaning method according to claim 17, comprising a controlling step of~~ A method of cleaning at least one of a reaction tube which is included in a heat treatment apparatus and an exhaust pipe which is connected to the reaction tube, said method comprising:

loading an object to be heat-treated into the reaction tube;

forming a first film on the object by supplying a first reactant gas into the reaction tube;

forming a second film on the object after stopping supplying the first reactant gas into the reaction tube and supplying second reactant gas which differs from the first reactant gas;

removing a product produced in said first film-forming step and a product produced in said second film-forming step which attach to at least one of the reaction tube and the exhaust pipe, by exhausting gas contained in the reaction tube through the exhaust pipe and supplying hydrogen fluoride gas into at least one of the reaction tube and the exhaust pipe; and

controlling pressure within the exhaust pipe to be fluctuated in such a way that a period at which the pressure is 10kPa or higher and a period at which the pressure is less than 10kPa are cyclically repeated, and that the period at which the pressure is 10kPa or higher can be obtained longer than the period at which the pressure is less than 10kPa.

21. (Currently amended) The cleaning method according to claim 17, comprising:

~~a removing step of~~ removing impurities being exhausted in a plurality of positions of the exhaust pipe by a trap; and

~~a controlling step of~~ controlling pressure of ~~fluoride~~ ~~hydrogen~~ hydrogen fluoride gas in a position between the plurality of traps, by controlling an opening degree of a gas-flowing path of the exhaust pipe.

22. (Currently amended) The cleaning method according to claim 17, said method including a removing step of further comprising removing ~~fluoride~~ hydrogen hydrogen fluoride gas by:

decompressing the exhaust pipe, after stopping supplying the ~~fluoride~~ hydrogen hydrogen fluoride gas;

supplying film-forming gas into at least one of the reaction tube and the exhaust pipe, after repeating supplying purge gas and decompressing the exhaust pipe for a given number of times; and

repeating supplying purge gas and decompressing the exhaust pipe for a given predetermined number of times again.

23. (Currently amended) The cleaning method according to claim 22, wherein:

the purge gas is composed of comprises nitrogen gas; and
the film-forming gas includes alkoxy silane.

24. (Currently amended) The cleaning method according to claim 17, wherein:

said film-forming step includes a step of forming [.] a silicon oxide film on an object to be heat-treated, ~~a silicon oxide film~~ by resolving alkoxy silane;

said second film-forming step includes a step of forming [.] a silicon nitride film on the object, ~~a silicon nitride film~~ by a reaction of ammonia and a silicon compound;

said cleaning step includes a step of exhausting the reaction tube through the exhaust pipe and a step of supplying ~~fluoride~~ hydrogen hydrogen fluoride into at least one of the reaction tube and the exhaust pipe, thereby removing a reactive product which is produced by resolving alkoxy silane and a reactive produce which is produced by a reaction of ammonia and a silicon compound and both of which attach to at least one of the reaction tube and the exhaust pipe.

25. (New) The cleaning method according to claim 17, wherein:

the exhaust pipe is split into first and second vents at a downstream side of the gas flowing path of the exhaust pipe relative to the reaction tube; and

said cleaning step includes conducting exhaust gas into one of said vents in which a scrubber for scrubbing the hydrogen fluoride gas is disposed when the hydrogen fluoride gas is exhausted, and conducting exhaust gas into the other of said vents when no hydrogen fluoride gas is exhausted, by using a valve which is arranged between said one vent and said other vent.

26. (New) The cleaning method according to claim 17, wherein:

said cleaning step includes measuring pressure in the reaction tube and the exhaust pipe and controlling an opening degree of the gas-flowing path of the exhaust pipe to control the pressure at a desired value by a pressure control valve which is arranged in the exhaust pipe.

27. (New) The cleaning method according to claim 17, wherein:

said cleaning step includes heating up the exhaust pipe to a temperature in a range of 100°C to 150°C, whereby supplying the hydrogen fluoride gas to the reaction tube and the exhaust pipe.

28. (New) A method of cleaning at least one of a reaction tube which is included in a heat treatment apparatus and an exhaust pipe which is connected to the reaction tube, said method comprising:

loading an object to be heat-treated into the reaction tube;

forming a first film on the object by supplying a first reactant gas into the reaction tube;

forming a second film on the object after stopping supplying the first reactant gas into the reaction tube and supplying second reactant gas which differs from the first reactant gas; and

removing a product produced in said first film-forming step and a product produced in said second film-forming step which attach to at least one of the reaction tube and the exhaust pipe, by exhausting gas contained in the reaction

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tube through the exhaust pipe with a gas-flowing path of the exhaust pipe being opened and closed and pressure in the reaction tube and the exhaust pipe being controlled, and supplying hydrogen fluoride gas into at least one of the reaction tube and the exhaust pipe.